#### Storied research aircraft retired after more than four decades in the skies

By Jay Levine

X-Press Editor

Dryden's venerable NB-52B aircraft was recognized Dec. 17 for a career spanning nearly fifty years, a tour of duty in which the big bird played a role in airlaunching generations of experimental aircraft.

The retirement ceremony brought together people from the aircraft's past and present as it is prepared for its future as a historical monument at the Edwards Air Force Base north gate. There, it will inspire new generations of researchers and pay tribute to its role as one of the most important aircraft in flight research history.

The NB-52B's first missions were in the hypersonic X-15 program, where the aircraft launched 106 of the program's 199 flights. Appropriately, the aircraft's last mission was the airlaunch of the hypersonic X-43A, which broke records with a nearly Mach 10 flight in November.

Former Dryden pilot Ed Schneider hosted the ceremony.

"This airplane has played a pivotal yet largely unsung role in many significant aeronautics and space flight programs," Schneider told a large crowd gathered in Dryden's 4802 hangar. "I was privileged to fly her and perform some of the many tests represented by the silhouettes on her fuselage – 008 is a grand lady and always fun to fly."

Former Dryden research pilot Fitzhugh 'Fitz' Fulton also recalled his experiences flying the NB-52B. He and Schneider thanked Air Force maintenance crews, from the craft's early days - and since 1976, the NASA crews - for working through the night to get the vehicle ready for pre-dawn missions.

"It was an interesting and challenging airplane to fly," Fulton recalled. "It took off faster than any other B-52 because we didn't use the flaps. It was a great feeling when you dropped a test vehicle. There



EC04 0327-38

NASA Photo by Tom Tschida

The NB-52B takes flight in the photo at top, EC04 0325-5 by Tony Landis. In the image above, Dryden employees welcome the NB-52B back to Dryden in November after its successful X-43A airlaunch, the final mission of its nearly 50-year career.

was a great big thump, like dropping a

"(When airlaunching the X-15) we listened for the rocket engine to fire up a few seconds after the drop. You could hear the rocket engine fire up, and in just a few seconds the rocket airplane would come up in front of the nose and we had the best view of the whole operation we could see the rocket plume and the

See NB-52B, page 8

# O'Keefe resigns

**NASA News Services** 

NASA Administrator Sean O'Keefe, who in the past three years led the Agency through an aggressive and comprehensive management transformation and helped it through one of its most painful tragedies, has resigned his post.

In his resignation letter to President Bush, O'Keefe wrote, "I will continue until you have named a successor and in the hope the Senate will act on your nomination by February."

"I've been honored to serve this president, the American people and my talented colleagues here at NASA,' O'Keefe said. "Together, we've enjoyed unprecedented success and seen each other through arduous circumstances. This was the most difficult decision I've ever made, but it's one I felt was best for my family and our future."

O'Keefe, 48, is NASA's 10th administrator. Nominated by President Bush and confirmed by the U.S. Senate, he was sworn into office Dec. 21, 2001. It was O'Keefe's fourth presidential appointment.

After joining NASA, O'Keefe focused his efforts on successfully bringing financial credibility to the Agency and eliminating a \$5 billion budget shortfall for the International Space Station program. He introduced several innovative management and budget reforms and led all federal agencies in the implementation of the President's Management Agenda, designed to make government more responsive and efficient. In three of the original five agenda categories, NASA's performance is at the highest

The tragic loss of seven astronauts aboard the Space Shuttle Columbia as it re-entered Earth's atmosphere during STS-107 on Feb. 1, 2003, focused the nation's attention on the future of America's space program.

O'Keefe directed significant changes in the Space Shuttle's safety and management programs. He was a key architect of the president's vision for space exploration, announced in January 2004 during a speech by the president at NASA Headquarters in Washington, D.C.

The vision for space exploration led a transformation of NASA and has positioned the Agency to meet the challenges of safely returning the Space Shuttle to flight, completing the

See O'Keefe, page 2

### Inside



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DC-8 returns from frosty Alaska, page 6

News **December 31, 2004** 

## O'Keefe ... from page 1

International Space Station, exploring Earth's complexities and returning to the moon, going on to Mars and beyond.

"The president and Congress have demonstrated their faith in us. We need to seize this opportunity," O'Keefe said. "NASA has a new direction that will push the boundaries of technology, science, space flight and knowledge, and will inspire new generations of explorers for years to come and secure this great nation's future."

Encouraging students to study mathematics, science and technology has been a priority for O'Keefe. In April 2002, he unveiled a new Educator Astronaut program, in which a select few of outstanding teachers would be chosen to join NASA's Astronaut Corps. The new Educator Astronaut candidates were introduced in May on Space Day and are in training at Johnson Space Center in Houston.

During his tenure, O'Keefe realized a number of significant mission triumphs, including Cassini's exploration of Saturn and its moons, the successful hypersonic test flights of the X-43A and the historic landing of the twin Mars Exploration Rovers Spirit and Opportunity on the Red Planet in January 2004.

"NASA is the only agency in the world where its people are allowed to dream big and then work to make those dreams come true. Who wouldn't treasure the opportunity to be a part of pioneering history?" O'Keefe wrote in his resignation. "I'm humbled by the dedication and determination of the NASA family and their commitment to the future of exploration. I wish each of them the very best. I am confident in their ability to carry out what we've started."

O'Keefe first joined the Bush administration as deputy director of the Office of Management and Budget, overseeing preparation, management and administration of the federal budget and government-wide management initiatives.

From 1989 to 1992, he served as comptroller and chief financial officer of the Department of Defense. President George H. W. Bush appointed him Secretary of the Navy in July 1992.

Before joining then Defense Secretary Dick Cheney's Pentagon management team, he served on the U.S. Senate Committee on Appropriations staff for eight years, and was staff director of the Defense Appropriations Subcommittee.

His public service began in 1978 when he was selected as a Presidential Management Intern.

O'Keefe is a Fellow of the National Academy of Public Administration; a member of the Committee on Climate Change Science and Technology; and a Fellow of the International Academy of Astronautics.

During his academic postings, he was a visiting scholar at the Wolfson College of the University of Cambridge, England; a member of the Naval Postgraduate School civil-military relations seminar team; and seminar leader for the Strategic Studies Group at Oxford University, England.

O'Keefe served on the national security panel to devise the 1988 Republican platform and was a member of the 1985 Kennedy School of Government program for national security executives at Harvard University.

N.Y. In 1993, he received the Distinguished Public Service Award from the first President Bush. He was the 1999 faculty recipient of the Syracuse University Chancellor's Award for Public Service; recipient of the Department of the Navy's Public Service Award in December 2000; and has been awarded honorary

Administrator Sean O'Keefe visited Dryden in September.

Dryden scholarship winner named

EC04 0292-01

Kerisha Schultz, center, daughter of Craig and Dawn Schultz of California City, was recently named the recipient of the Joseph A. Walker Memorial Scholarship, given by Dryden's Employee Exchange Council. Schultz, pictured with Dryden Cente. Director Kevin Petersen, left, and her father, is a graduate of Tehachapi High School and a freshman at Point Loma Nazarene University, San Diego, majoring in liberal studies. She plans to become an elementary school teacher. The scholarship, the 20th to be awarded by the Exchange Council, is named for former Dryden chief pilot Joe Walker, who lost his life in an aircraft accident in 1966. The scholarship is offered annually to high school seniors who are children of current or former government or contract employees at Dryden. The \$6,000 scholarship will be paid over four years of college if a 3.0 grade-point average is maintained. Craig Schultz works with computerassisted drafting tools and is employed by Lockheed-Martin at Dryden.

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NASA Photo by Tom Tschida

doctorate degrees from several prestigious educational institutions. In March 2003 and 2004, he was recognized and honored by Irish American magazine as one of the Top 100 Irish Americans.

He is the author of several journal articles, contributing author to "Keeping the Edge: Managing Defense for the Future" released in October 2000, and in 1998, co-authored "The Defense Industry in the Post-Cold War Era: Corporate Strategies and Public Policy Perspectives."

O'Keefe earned his Bachelor of Arts degree in 1977 from Loyola University, New Orleans, and his Master of Public Administration in 1978 from the Maxwell

NASAPhoto by Tom Tschida

found previously. School of Citizenship and Public Affairs

Syracuse

University,

for second year NASA lit a birthday candle Jan. 3 for the twin Mars Exploration Rovers Spirit and Opportunity when Spirit began its second year on Mars, investigating puzzling rocks unlike any

Rovers' work on

Mars continues

The rovers successfully completed their three-month primary missions in April 2004, astounding even their designers with how well they continue operating. The unanticipated longevity is allowing both rovers to reach additional destinations and to continue making discoveries. Spirit landed Jan. 3, 2004, and Opportunity Jan. 24, 2004. http://www.nasa.gov/home/hqnews/2005/ jan/HQ\_05001\_rovers\_continue.html

## **Astronomers** discover the most powerful eruption the universe

Astronomers have discovered the most powerful eruption in the universe using NASA's Chandra X-ray Observatory. A super-massive black hole generated the eruption by growing at a remarkable rate. This discovery shows the enormous appetite of large black holes, and the profound impact they have on their surroundings.

The huge eruption was seen in a Chandra image of the hot, X-rayemitting gas of a galaxy cluster called MS 0735.6+7421. Two vast cavities extend away from the super massive black hole in the cluster's central galaxy. The eruption, which has lasted for more than 100 million years, has generated energy equivalent to hundreds of millions of gamma-ray

http://www.nasa.gov/home/hqnews/ 2005/jan/HQ\_05004\_chandra.html

## **Elements in place** for Space Shuttle return to flight

NASA marked a major milestone for the Space Shuttle's return to flight as the redesigned external fuel tank rolled out Jan. 6 from the barge that carried it to Kennedy Space Center,

The tank was taken to Kennedy's Vehicle Assembly Building for a final checkout. It eventually will be attached to the twin solid rocket boosters and the Space Shuttle Discovery for its return to flight mission, STS-114.

NASA and Lockheed Martin Corp. spent nearly two years upgrading the tank to make it safer for liftoff.

"This will be the safest tank we've ever flown, no doubt about it," said Space Shuttle Program Manager Bill

http://www.nasa.gov/missions/shuttle/ et\_arrives.html

NASA Dryden X-Press

**December 31, 2004** 

# **Dryden validates ChemSecure**

By Leslie A. Williams Public Affairs Specialist and Dan Race

Oracle Corporation

Dryden is implementing an extensive wireless, sensor-based system aimed at improving the management of hazardous materials to enhance security and safety while significantly reducing ongoing supply chain costs.

The ChemSecure pilot program integrates Radio Frequency Identification and sensor-based technology with the Department of Defense's existing webbased Hazardous Materials Management System database to automate real-time management of hazardous materials, including usage, shipment, tracking and storage. The first project of its kind, ChemSecure was developed by Dryden safety officials in close partnership with the Defense Department and leading private-sector companies, including Oracle Corp., Redwood Shores, Calif.; Technologies Corp., Intermec headquartered in Everett, Wash.; EnvironMax Inc., Salt Lake City, Utah; and Patlite (USA) Corp., Torrance, Calif.

"The ChemSecure program is a testament to NASA's commitment to using advanced technology and business processes to create safer, more secure management systems for hazardous material movement and storage," said Ralph Anton, chemical program manager at Dryden.

"ChemSecure's guiding business processes and technology foundation are not limited to the hazardous materials environment — we see numerous applications for tracking of a variety of materials in both the public and private sectors, and plan to help agencies and organizations take advantage of the system."

ChemSecure places RFID tags on hazardous material containers and uses Oracle Sensor-Based Services to capture, manage, analyze and respond to any movement or other change with the chemicals. Dryden applies the real-time information in the HMMS database to make informed decisions about the transportation and storage of hazardous materials, and provides automatic alerts text messaging, voice alerts and e-mails to security, safety, health and environmental professionals to alert them of changes taking place with hazardous materials.

ChemSecure utilizes data captured by Intermec 750 mobile computers, IP3 RFID mobile readers and fixed RFID readers, temperature sensors, and Patlite visual response devices to ensure that



NASA Photo by Tom Tschida

Above and below, Christina Urias, a Dryden chemical crib technician, inventories chemicals into the ChemSecure system. Dryden safety officials, in partnership with the U.S. Department of Defense and several companies, developed the system, which integrates radio frequency identification and sensor-based technology with an existing da-



EC040346-6

**NASA Photo by Tom Tschida** 

information. chemical Security professionals are notified, for example, if unauthorized attempts are made to access hazardous materials, and environmental professionals are alerted when the storage limit of a hazardous chemical locker is in danger of being exceeded.

In addition to helping organizations

costs and errors, the ChemSecure program includes additional capabilities such as:

· Supplying critical data to first responders and decision makers so they are equipped to make timely decisions for the safety of personnel as well as for physical assets in the environment during an emergency evacuation involving a chemical spill;

 Monitoring personnel when they handle hazardous containers and

providing accountability by crosschecking personnel information with container information to reduce theft, error and fraud; · Providing end-to-end visibility of the hazardous materials transportation and storage life cycle for improved decision

making and auditing;





Editor's note: In recognition of the NB-52B's contributions to aviation history, this issue's Lakebed Legacies is dedicated to some of the key events in the aircraft's service.

## **NB-52B Program** Chronology

1955-1959 - B-52B was built at Boeing's Seattle manufacturing facility and was first flown June 11, 1955. It was used by the U.S. Air Force as a bomb/navigation system test aircraft until 1958. B-52B was sent to the North American Aviation facility in Palmdale for modifications on Dec. 13, 1958, and work began Jan. 6, 1959. The airplane's right wing structure was modified to accept a launch pylon for the X-15 and the wing flaps were permanently bolted closed. A notch was cut in the right wing flap to accommodate the vertical tail fin on the X-15. Military systems, such as the tail gun, were removed. The X-15 launch pylon was installed between the inboard right engine nacelles and the fuselage. Crew accommodations were added for a launch panel operator. Then designated NB-52B, it was flown to Edwards Air Force Base where it joined the NB-52A.

1959-1968 - Used for airlaunch of the four X-15 vehicles (three in the basic configuration and one later modified for increased fuel capacity), the NB-52B carried the X-15s aloft 161 times resulting in 106 launches. The NB-52B was first used to launch an X-15 during the hypersonic vehicle's fifth flight, on Jan. 23, 1960.

1961 – NB-52B hosted the Inertial Flight Data System pod tests.

**1966-1975** - The lifting body program required the NB-52B to carry five different vehicles (HL-10, M2-F2, M2-F3, X-24A, X-24B) aloft 164 times for 127 successful launches.

**1970** – The NB-52B was used to simulate Space Shuttle landing approaches.

**1973-1981** – The 3/8-scale F-15 Spin Research Vehicle study consisted of three vehicles that were carried aloft on the NB-52B 72 times resulting in 52 drops.

1976 – The NB-52B was transferred to NASA as a permanent-loan asset on April 26, 1976.

**1977** – The aircraft conducted two flights for the Air Force Weapons Laboratory. Studies flown included 30 passes at Idaho National Engineering Laboratory near Idaho Falls, Idaho, to assess the effects of engine and wingtip wake vortices on laser propagation.

**1977-1978** – The Shuttle Solid Rocket Booster parachute system drop-test vehicle was researched using the NB-52B. First test series included six drops.

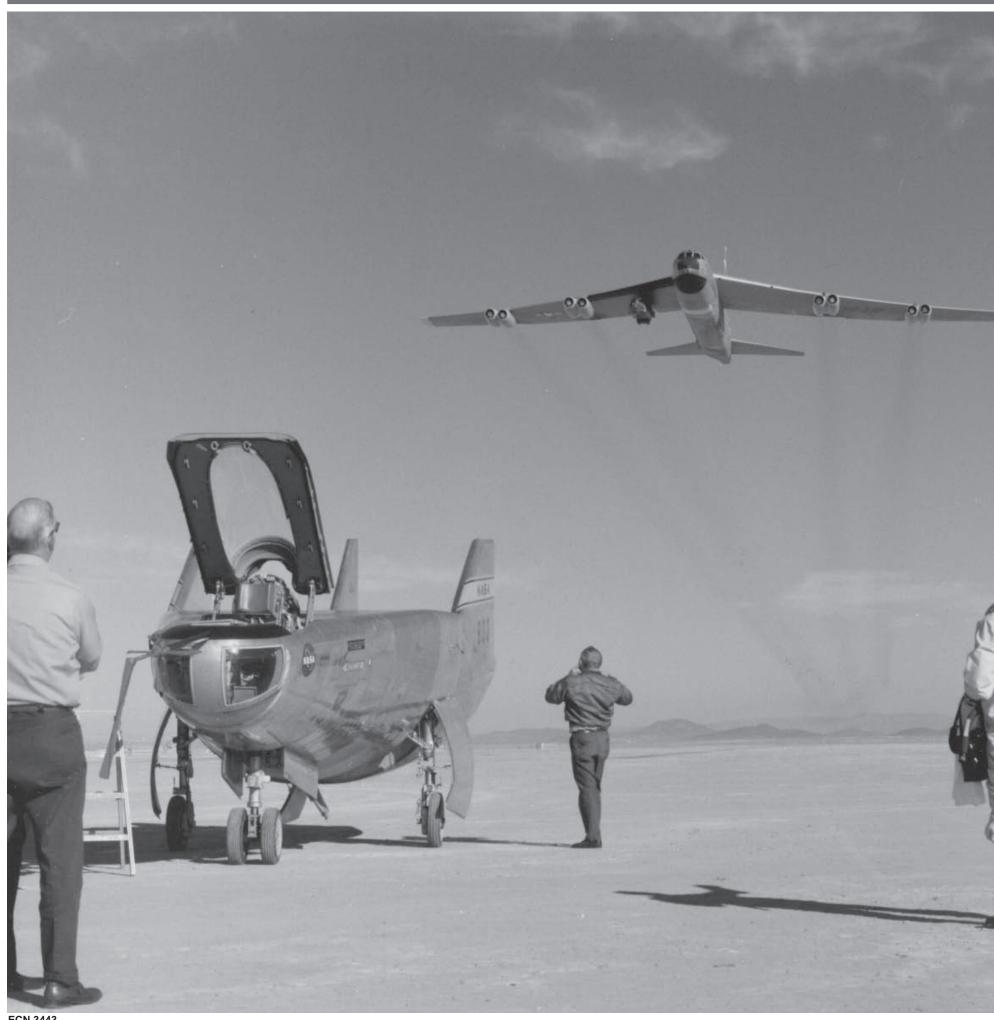
**1978-1979** - NB-52B used for research of the F-111 crew escape system parachute test vehicle. First test series included eight drops.

See Legacies, page 6

NASA Dryden X-Press

Shop, (661) 276-2113.

**Focus December 31, 2004** 



ECN 3443

By Gray Creech Dryden Public Affairs

ith a penchant for chasing tomorrow, NASA's B-52B "008" perenially carried the future of flight under its wing.

First taking to the air in June of 1955, the venerable aircraft began its illustrious, nearly 50-year U.S. Air Force and NASA career as a bomb navigation system test airplane for the Air Force's B-52 fleet. Ironically, the bomb/nav system test bomber spent the bulk of its career dropping flight research vehicles rather than bombs.

In 1959 it became one of two mothership launch aircraft for the X-15 program, which paved the way for America's early manned space flight

efforts. Double-0-eight cut its teeth launching the X-15 on 106 of the program's 199 missions.

The B-52B's first and last missions launched hypersonic research vehicles, the first being launch of X-15 No. 1 in 1960. Beginning with the X-15 program, which matured reaction control systems and thermal protection systems for spacecraft, and ending with the X-43A project, NASA 008 served hypersonic research well.

"I was here in January 1960 for the aircraft's first X-15 flight and in November 2004 for the last X-43A flight, and for all of the flights in between," said Roy Bryant, Dryden's B-52B project manager of nearly 30 years. "Pride, dedication and innovation have been the key elements of the

# Key people helped NB-52

#### **NB-52B Pilots** and Co-pilots

Allavie, John E. "Jack" Andonian, Harry Archer, Harry M. Batteas, Frank W. Bedke, Curtis M. Bement, Russell P. Benefield, Thomas D. "Doug" Best, Albert H. III Bock, Charles C., Jr. Bowline, Jerry D. Branch, Irving "Twig" Buker, Russell S. Burgenheim, Miles E. Butchart, Stanley P.

Claxton, Richard W. Cole, Frank E. Cotton, Joseph P. Cross, Carl S. Doryland, Charles J. Fiedler, Frederick A. Fisher, Allen Fornell, Gordon E. Franzen, Ronald V. Fritz, Nicholas H., Jr. Fullerton, C. Gordon Fulton, Fitzhugh "Fitz" Goodwin, George W. III Harper, Earle D. Heaton, Robert R. Hinds, Bruce J., Jr.

Hines, Joseph V. Higgins, Thomas Hood, Robert C. Ishmael, Stephen Jones, Gayland E. "Gay" King, Michael Kuyk, Charles F. G., Jr. Larson, George W. LeBeau, Thomas J., Jr. Lewis, Kenneth K. Loewe, William R. Luck, George E. Lyddane, George H. Lynch, George P., Jr. Mallick, Donald R. Manke, John A.

McMurt McDow Miller, J Morgan. Mosley, Neubert O'Hara, Purifoy, Ranz, D Reschke Riedena Schneid "Fas Scobee, Skabo, I

Small, J

4 NASA Dryden X-Press December 31, 2004 FOCUS





EC01 084-5

NASA Photo by Jim Ross

Above, the NB-52 casts a commanding shadow over Antelope Valley skies.

Main photo, far left, Dryden pilot John Manke (later a Dryden Center Director) waves to the NB-52B crew after a successful research mission in which the "mothership" airlaunched the M2-F3. The lifting body aircraft validated an airframe shape that would later influence design of the Space Shuttles.



The NB-52B airlaunched the parachute test vehicle that helped develop improvements to the F-111 crew escape system

# Workhorse NB-52B

# 2B missions hit the mark

ry, Thomas C.
ell, Edward D.
ohn
Richard L.
Robert L.
, Axel P.
Brian
Dana D.
ale M.
, William G., Jr.
uer, Robert L.
er, Edward T.
t Eddie"
Francis R. "Dick"

Paul S.

ohn T., Jr.

Smith, Rogers E.
Smolka, James W. "Smoke"
Snyder, Cecil O.
Stroup, Floyd B.
Sturmthal, Emil "Ted"
Townsend, Guy M.
Vanderhorst, Daniel R.
Wood, William E., Jr.

## NB-52B Launch Panel Operators

Anderson, Brian (X-38) Berkowitz, William "Bill" (X-15) Butchart, Stanley P. (X-15) Currie, Alan (X-38) Dustin, Allen F. (X-15) Fox, Jeff (X-38)
Henry, Jerry (F-15 SRV, DAST,
HiMAT)
Horton, Victor W. (HL-10, M2-F2,
M2-F3, X-24A, X-24B, SRB PTV)
McAllister, Dave (X-43A)
Minnick, Brian (X-43A)
Moise, John W. "Jack" (X-15)
Muratore, John (X-38)

Neal, Brad (Pegasus, X-43A) Obrien, Harold (F-15 SRV, HiMAT) Peterson, Bruce A. (X-15) Pomeroy, John (X-43A) Reed, Don (X-38)

See Key people, page 7

people who maintained this vintage aircraft to support the many projects that have kept the United States at the forefront of aerospace development for the past 45 years."

Since the end of the X-15 program in 1969, NASA 008 has supported virtually all of NASA's aeronautical research programs requiring airlaunch, and some research missions that didn't.

The Space Shuttle owes several design characteristics and later refinements to NASA 008.

Beginning in the mid-1960s, NASA 008 carried aloft several types of lifting body aircraft over a 10-year period. These wingless wonders demonstrated the controlled flight without wings and precision landing without power that proved the viability of gliding Space

Shuttle landings. With the arrival of the Shuttle era, NASA 008 dropped Shuttle solid rocket booster test vehicles in order to test the booster recovery parachute system. During the early 1990s, the aircraft kicked up plumes of dust on Rogers Dry Lake wringing out the Shuttle's new drag chute system.

One of the more memorable missions for Bryant was a day in 1978 that one of the Shuttle solid rocket booster test vehicles didn't drop on command.

B-52 launch panel operator Ray Young reported that his lights indicated the hooks holding the vehicle had opened, even though the vehicle remained attached to the pylon. Pilot Fitz Fulton tried maneuvering the

See Retire, page 7

NASA Dryden X-Press

# DC-8 completes Alaskan mission

By Beth Hagenauer

Dryden Public Affairs

NASA's DC-8 traveled to frosty Alaska in November to study active volcanoes, the Hubbard glacier, forests and sea ice. Using the NASA Jet Propulsion Laboratory's Airborne Synthetic Aperture Radar (AirSAR), digital elevation models were taken that will allow scientists to evaluate landscape changes and assess volcanic hazards.

The Alaska AirSAR 2004 study began in September but the mission was delayed when the aircraft sustained damage during takeoff at Elmendorf Air Force Base in Anchorage.

Making the trek to Alaska during winter weather conditions proved a challenge for the Dryden-based Lockheed maintenance crew. In addition to being prepared to deice the aircraft – a procedure that's rarely called for at the aircraft's home base in Southern California – two crewmembers stayed with the DC-8 to keep both plane and onboard instrumentation warm during the cold Alaska night.

"The ground crew did a great job in getting the aircraft ready under a tight schedule and in getting us off each morning, on schedule and in less-thanideal weather conditions," said Steve



EC04 0047-11

NASA Photo by Tony Landis

The DC-8 – bearing its Dryden paint scheme – flies a mission in 2004. The research aircraft recently returned from a mission in Alaska.

Durden, AirSAR manager at JPL in Pasadena.

"The volcanoes – Veniaminof, Shishaldin, Westdahl, Cleveland, Carlisle, Herbert and Spurr – are among the 100 active volcanoes at the higher latitudes in the North Pacific region," explained Ken Dean, research associate professor at the Geophysical Institute, University of Alaska at Fairbanks. "These volcanoes have the potential of injecting ash into the troposphere and stratosphere, which is of concern to commercial and military aircraft. Studying subtle volcanic changes may eventually improve the ability to alert the public, government agencies and industry of potential ash eruptions."

AirSAR acquired data that will be used to derive an accurate digital elevation model of the Hubbard glacier, which has been advancing since it was first mapped in 1898, enabling scientists to assess its mass.

New data captured by AirSAR during the 2004 study will be compared to similar data taken during 1988, to assess possible changes in recent climate patterns.

Scientists have gathered biophysical information of forest study sites from the Kenai Peninsula to Northern Alaska's Brooks Range to use in comparing vegetation at the study sites to that of surrounding areas.

Chris Miller, Dryden's DC-8 mission manager, credited Airborne Science personnel for the success of the mission, noting that some went beyond the call of duty and made heroic efforts to complete the study in difficult weather.

The Alaska study was funded by NASA's science mission directorate. The directorate's work is focused on understanding the Earth as an integrated system and using Earth system science to improve prediction of climate, weather and natural hazards.

## **NB-52B**

#### ... from page 3

1979 – The NB-52 served as a large radar target for F-16 targeting studies. 1979-1983 – Drones for Aerodynamic and Structural Testing included four vehicle configurations carried aloft 13 times resulting in six drops.

1979-1983 – Used for the Highly Maneuverable Aircraft Technology program, where two vehicles were carried aloft 40 times resulting in 26 launches.

**1982** – F-111 crew escape system parachute training vehicle second test series included 11 drops.

**1983-1985** – Shuttle solid rocket booster drop test vehicle second test series included eight drops.

**1987-1989** – F-111 crew escape system parachute training vehicle third test series included 23 drops.

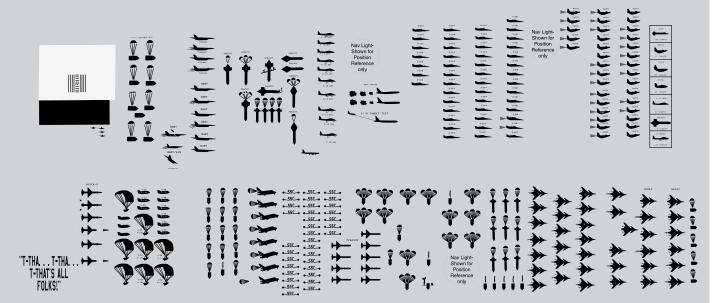
1989-1994 – The Pegasus expendable launch vehicle involved six vehicles carried aloft 13 times. Six launches were conducted (five over the Western Test Range and one over the Eastern Test Range).

1990 – Eight test runs were conducted for the Space Shuttle drag chute tests. 1991-1992 – F-111 crew escape system parachute training vehicle fourth test series included 15 drops.

1993-1997 – Supersonic cruise emissions environmental studies. The program included 33 flights with a special test fixture that held two J85 engines.

**1996** – Interphone system prototype tests conducted.

**1997-2001** – The X-38 Crew Return Vehicle research included three



Each research flight of the NB-52B is reflected in markings that appear on its fuselage. Tony Landis, of the Dryden photo lab, created this image of the final markings configuration. The top tier of the graphic, nose to wing (right to left), reflects the earliest missions. The final missions of the NB-52B are on the second tier of the graphic at far left.

vehicles that were carried aloft 21 times resulting in eight drops. The NB-52B made its 1,000th flight on Sept. 16, 1999. The crew consisted of Ed Schneider, Frank Batteas, and David Dennis. Merri Sanchez, an X-38 launch panel operator, became the first woman to fly aboard the NB-52B on June 5, 1997.

2001-2004 – Three X-43A hypersonic research vehicles were carried aloft six times resulting in three launches. The NB-52B made its final research flight Nov. 16, 2004, including a successful X-43A launch. The crew consisted of C. Gordon Fullerton (pilot), Frank Batteas (co-pilot), Brian Minnick (X-43 launch panel operator), and Brad Neal (X-43 monitor station operator).

Lakebed Legacies compiled by Peter Merlin



EC88 180-7

NASA Photo

The NB-52B flies one of 106 missions in the X-15 program, for which the aircraft was originally assigned to Edwards. The aircraft has flown nearly 50 years and was instrumental in some of the most important research missions in aerospace history. It made its final flight Nov. 16, which, ironically, also involved carrying a hypersonic vehicle, the X-43A. The NB-52B was retired Dec. 17.

## ChemSecure ... from page 3

- Ensuring chemicals are placed in appropriate and safe locations to avoid adverse reactions with other chemicals; and
- Ensuring that personnel are properly authorized and trained to work with chemicals, to reduce human error.

"The ChemSecure pilot is a great example of how organizations can

6

connect the physical world to the information world to improve operations, enhance business processes and reduce costs," said Allyson Fryhoff, vice president of Oracle Sensor-Based Services. "RFID and other sensor-based technologies can present many new challenges regarding information

management. It's imperative that organizations have the appropriate information infrastructure in place to meet these demands."

Dryden is planning a second phase of the ChemSecure project that will provide enhanced features for scrutinizing all vehicles entering and leaving unguarded access points at the Center and for maintaining full inventory management throughout the facility, extending the project's homeland security aspects. Additionally, the sensor-based technology will track all climate-controlled chemicals in restricted environments.

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## Retire ... from page 5

aircraft to free the stuck vehicle, but to no avail. "There was a lot of concern that we'd damage the B-52 if it came loose on landing," Bryant remembers. Fulton eased the B-52 in for a smooth landing, and the test vehicle held on.

Over the years the aircraft launched various experimental fixtures, such as the FB-111 crew capsule, and advanced remotely piloted vehicles like the F-15 Spin Research Vehicle, both for the Air Force.

Maintenance crews over the years grew fond of the aircraft, treating it more like a classic car than an old bomber. Double-0-eight's crews kept it ship-shape, seldom failing to have the aircraft ready for a mission - not that the old bird didn't balk occasionally at the prospect.

Always reliable, NASA 008's long career ended as historically as it began, launching the last hypersonic X-43A scramjet-powered research vehicle on Nov. 16, 2004, to nearly Mach 10, a record speed for airbreathing aircraft.

A hieroglyphic-like silhouette representing the last research mission, recently painted on by crewmember Monty Hodges, joined others on the aircraft's starboard fuselage, a virtual

## Key people ... from page 5

Richards, Bob (Pegasus) Russell, John "Jack" (X-15, HL-10, M2-F3, X-24A, X-24B, F-15 Sanchez, Merri J. (X-38)

Young, Ray O. (X-24B, F-15 SRV, Firebee, DAST, HiMAT, F-111 PTV)

#### NASA NB-52B **Crew Chiefs** (1976-2004)

Glynn H. Hall Charles D. Guilinger Daniel J. Bain Michael D. Bondy Kenneth Wilson

List compiled by Peter Merlin

museum wall documenting every mission of the aircraft's flight through

As NASA 008 flies into the sunset, its legacy continues to soar into the future. Thanks for the ride, 008.



Crew Chief Mike Bondy, center, talks with Joe Kinn as Dyncorp's Charlie Nichols, left,

completes another task on X-43A flight day, Nov. 16. Following the NB-52's successful completion of the X-43A project and the NB-52B's retirement Dec. 17, Bondy retired Jan. 3.



EC01 0339-33

EC00 239-24

**NASA Photo by Carla Thomas** 

Above, the NB-52B was used in the successful 2001 airlaunch of the X-38 Crew Return Vehicle prototype. By using a parafoil (guided parachute), the X-38 program tested the concept of making short precision landings with lifting body-shaped aircraft.

At right, the big bird on a rare snowy day at Dryden.





**NASA Photo by Tony Landis** 

Above, night crewmembers, from left, Ade Gordon, Clinton St. John, Shane Wilson and Gary Pacewitz look over the X-43A under the wing of the NB-52B.

**NASA Photo** 

**NASA Photo by Tony Landis** 

At left, from left, in a 2001 photo, mechanic Bob Cummings, Crew Chief Dan Bain, and Sam Groce work to secure a bolt that attached the X-38 pylon to the wing of the NB-52B.

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## NB-52B ... from page 1

airplane accelerating at some fast speed. Then we would listen to the rest of the flight on the radio," he said.

Gordon Fullerton, current Dryden chief pilot, told the crowd he'll miss flying the historic aircraft.

"Ed mentioned when he first came up here that this is a celebration. It's a sad day - more like a funeral than a celebration – to realize that I'm not likely to crawl in 008 and go out for another flight," he said.

Fullerton, a former astronaut, said he came to Dryden in late 1986 and on March 10, 1987, flew with Don Mallick for Fullerton's first flight on the NB-52B. Fullerton has been involved in many flights since then as project pilot, flying most of the missions involving the big bird. Frank Batteas and Dana Purifoy also were qualified to fly the NB-52B.

Maintenance crews are the real heroes of the NB-52B's lore and were called on to resurrect it on more than one occasion to fly a mission. After one four-year layoff, the NB-52B was restored so it could carry the parachute test vehicle that was "a big, orange 3,500-pound box that fit nicely in the bomb bay," Fullerton said. That "box" helped to develop improvements to the F-111 crew escape system. Fullerton identified Mike Bondy and Gary Beard as key figures in returning the aircraft to flight

Fulton recalled a NB-52B Pegasus mission that succeeded despite unusual circumstances.

Four launches were made on the West Coast, off Monterey, Calif. The fifth was scheduled to depart from Kennedy Space Center, Fla. The first attempt on that mission didn't get past Barstow. After a fin problem occurred, the research bird returned to Dryden. Finally at Kennedy, the NB-52B mission called for release of the Pegasus at the altitude from which the BrazilSat satellite was to be launched into orbit.

"Bill Albrecht, the operations engineer on the airplane for many, many years, was the controller and he was in the control room, which was up at Wallops (Flight Facility, Wallops Island, Va.)," Fulton related. "He was the man we talked to. Jim Smolka was with me, and we got up higher than I had ever gotten with a heavy payload. I was patting myself on the back when we staggered up to 46,000 feet, thinking that was really good. We got a call a couple minutes before launch: 'No, no you're too high – go down,' so we descended. Then we got the call from Bill: '3, 2, 1 – launch!' We threw the switch and the rocket went off and launched the satellite.

"It was after landing we found out (that) at the time we heard '3, 2, 1 – launch,' all the rest of the control room behind Bill



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EC04 0363-11 NASA Photo by Tom Tschida

Above, former Dryden research pilot Ed Schneider takes the podium to share memories about the NB-52B. Also on hand to salute the aircraft were, seated from left, Dryden Center Director Kevin Petersen, Air Force Flight Test Center Commander Brig. Gen. Curtis Bedke, former Dryden pilot Fitzhugh L. "Fitz" Fulton Jr., Dryden Chief Pilot Gordon Fullerton, and AFFTC Historian James Young. Below, Fullerton, left, and Fulton share a handshake under the fuselage of the venerable aircraft.



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was hollering 'abort! abort!' But they were hollering on a com (communications) loop that Bill wasn't plugged into. That incident is classic now on these (training) courses that have been presented by several firms on how *not* to do control room ops. The good news is, the rocket did fine and the call didn't really need to be made. The desired orbit was obtained and it all came out well despite the confusion in the control room," he concluded.

U.S. Air Force Historian James Young confirmed that the NB-52B participated in more aviation history than any other airplane. The eighth production model B-52B was first flown June 11, 1955. The aircraft was exclusively used for flight research and dropped only research aircraft, he added.

"At the time (it came off the production line), I'd wager, no one could have conceived that this airplane would have a remarkable 49-and-a-half-year career," Young said. "In fact, several times during that span of those 49 years there were many people who said its service life was over."

Some of the NB-52B's assignments included carrying lifting body aircraft, including the HL-10, M2-F2, M2-F3, X-24A and X-24B; carrying drones for Aerodynamic and Structural Testing; Maneuverable Aircraft Highly Technology missions; tests for parachute recovery for Space Shuttle solid liquid boosters and drag chute deployment systems; and carrying Pegasus and X-38 prototype spacecraft.

Center Director Kevin Petersen said the work by NB-52B "shaped our collective

ability to fly in and out of the atmosphere." The aircraft "goes out on top" just a month removed from a successful X-43A airlaunch, he added. Petersen also thanked Matt Graham. Larry Harper, Monte Hodges and Tony Landis for cleaning up the aircraft's unique markings to ensure its mission history endures forever.

"But time waits for no man or machine," Petersen said. The NB-52B, he noted, was the only JP4-fueled aircraft (at Edwards) – making its situation the equivalent of finding leaded gas for an automobile. In addition, old aircraft parts could be replaced only by old aircraft parts, making regular maintenance a challenge.

Vince Fong, from the office of U.S. Rep. William "Bill" Thomas (R-22<sup>nd</sup> Dist.) read an acknowledgement of the aircraft's successes, which had been entered by Thomas into the congressional record on the day of the Dryden ceremonies. The aircraft will have a prominent position at the Edwards north gate and eventually will be joined by other historic aircraft that make Edwards home to some of the world's most exotic experimental aircraft and early production models.

Air Force Flight Test Center Brig. Gen. Curtis Bedke concluded the event, saying, "I am sad and thrilled to receive 'Balls 8' (as it is known, for its tail number, zerozero-eight) from NASA. We always hate to see an old explorer retired, but we're also thrilled that her final flight was how it should be - a research flight."

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